J Oral Res
oral and craniofacial sciences

Communication

Oropharyngeal cancer mortality according to the human development index in the Metropolitan Region of Chile, 2002-2014.

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Receipt: 11/02/2017 **Revised:** 11/15/2017
Acceptance: 01/15/2018 **Online:** 01/15/2018

Conflict of interests: There is no conflict of interest in the submission of this manuscript.

Ethics approval: Approval granted by the Bioethics Committee, School of Dentistry, Universidad Andrés Bello (Code 2017-53).

Funding: None.

Authors' contributions: The present research was carried out with the collaboration of all the authors. All authors read and approved the final manuscript.

Acknowledgements: The authors would like to thank Dr. Olivia Horna-Campos of the Public Health School, School of Medicine, Universidad de Chile, for her collaboration in the development of this study and Carolina Vidal, biostatistician at the School of Dentistry, Universidad Andrés Bello, for her contribution in obtaining the results of the manuscript.

Cite as: Livacic V, Grez JT, Candia J & Fernández A. Oropharyngeal cancer mortality according to the human development index in the Metropolitan Region of Chile, 2002-2014. J Oral Res 2018; 7(1):20-23. doi:10.17126/joralres.2018.003

Abstract: To determine mortality rates for oropharyngeal cancer according to the Human Development Index (HDI) per district in the Metropolitan Region (RM), Santiago, Chile, between 2002 and 2014. Materials and Methods: An ecological study was carried out. The sample corresponded to individuals over 45 years, from the Metropolitan Region, with oropharyngeal cancer as cause of death, as registered in the Chilean National Institute of Statistics (INE). The HDI was classified into three categories: "medium" (8 districts), "high" (18 districts) and "very high" (25 districts). The crude and adjusted mortality rates were calculated for each year and period. Results: The oropharyngeal cancer adjusted mortality rate for the chosen period was 3.98 deaths per 100,000 inhabitants. The specific mortality rate from oropharyngeal cancer in the "medium" HDI category was 4.01; in the "high" DHI category, 4.42; and in the "very high" HDI category, 3.79. Conclusion: Mortality from oropharyngeal cancer was higher in the "medium" HDI category between 2002 and 2014.

Keywords: oropharyngeal cancer; epidemiology; mortality; socioeconomic status.

INTRODUCTION.

Cancer takes the life of six million people yearly and has become one of the main causes of death worldwide. In 2012, oropharyngeal cancer (OPC) accounted for 1.8% of all types of cancer. The mortality rate of OPC has increased, from 0.82 per 100,000 inhabitants in 1989 and to 0.97 per 100,000 inhabitants in 2012.[1,2]

In Chile, the crude rate for oropharyngeal cancer was between 1.11 to 1.25 per 100,000 inhabitants between 2002 and 2010, was higher in men (1.69 per 100,000) and in people older than 55 years. However, mortality from OPC is increasing in females, because women smoke, drink alcohol and neglect to have a healthy diet in a frequency similarly to men.[3]

The distribution of mortality rates from OPC in the population is heterogeneous and varies according to several factors, such as clinical presentation, tobacco and alcohol consumption, viral infection and geographical distribution, among others. Specifically, these rates are higher in the population with the lowest socioeconomic status.[3]

The occurrence of OPC has become a serious public health problem.[1,2] The aim of this research is to determine the mortality rates from OPC

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according to the Human Development Index (HDI) in different districts of the Metropolitan Region (RM) in Chile.

MATERIALS AND METHODS.

Sample design and selection

An ecological study was carried out. The sample consisted of the total number of deaths registered in the Chilean National Institute of Statistics (INE) corresponding to 52 districts of the RM between 2002 and 2014.

All deaths from oropharyngeal cancer were included, considering the factors of age, gender and location of lesions. People under 45 years old were excluded due to the low death rates in this specific group (4%).

Variables

The variables of interest were sex, age, year of death, district of residence, HDI and the topographic location of tumors (based on the International Classification of Diseases ICD-10 updated in 2010), considering code [C00] to code [C14], which refer to lips, oral cavity and pharynx.

The HDI per district was obtained from the Chilean Ministry of National Planning (MIDEPLAN). Three categories were established: "medium" (8 districts), "high" (18 districts), and "very high" (25 districts). Since only one district (Lo Espejo) was classified as "low", it was grouped in the "medium" category.

Statistical Analysis

To calculate gross mortality, the number of deaths caused from OPC per year and period was used as numerator. The denominator represented the population projection based on the 2002 Census per year for each district of the RM. The rates were calculated per 100,000 inhabitants. The direct adjustment method was used to compare mortality rates between the districts and to control de effects of age, sex, and HDI variables. To obtain direct standardization, the 2008 reference population was used. Subsequently, the ratio of adjusted rates and the 95% CI according to the HDI were calculated.

RESULTS.

Between 2002 and 2014, there were 1,057 deaths (1%) from OPC from a total of 106,378 deaths in people over 45 years old in the RM region.

Of the total number of cases, 68.6% (726) of deaths corresponded to men; male/female ratio of 2.2:1. During the abovementioned period, the gross mortality rate in the RM was 3.98 deaths per 100,000 inhabitants, and the total adjusted rate was 3.98 deaths per 100,000 inhabitants.

According to the distribution per age group, a progressive increase in the crude death rate was observed, with the highest rate registered in those individuals over 75 years of age. This pattern was the same for both men and women.

The standardized rates according to age, sex and HDI are

Table 1. Standardized rates of mortality from oropharyngeal cancer according to age, sex and HDI. Metropolitan Region, 2002-2014.

Age group	Very High			High			Medium		
	M	F	Total	M	F	Total	M	F	Total
45-49	0,21	0,09	0,15	0,39	0,31	0,35	0,14	0,10	0,12
50-54	0,42	0,17	0,29	0,36	0,09	0,22	0,43	0,10	0,26
55-59	0,71	0,19	0,43	0,69	0,12	0,39	0,80	0,20	0,49
60-64	0,86	0,18	0,48	1,08	0,09	0,56	1,33	0,20	0,74
65-69	0,78	0,16	0,43	1,34	0,19	0,72	0,97	0,19	0,54
70-74	1,06	0,28	0,60	1,38	0,20	0,71	0,78	0,36	0,54
75-79	0,77	0,39	0,53	0,93	0,29	0,55	0,99	0,33	0,60
80+	1,07	0,74	0,84	1,45	0,54	0,85	2,02	0,45	0,99
Adjusted rate	5,88	2,20	3,76	7,62	1,83	4,35	7,46	1,94	4,28
Rate ratio	1	1	1	1,30	0,83	1,16	1,27	0,88	1,14
Confidence interval	-	-	3,76187-3,76195	-	-	4,34891-4,34899	-	-	4,28291-4,28299

Table 2. Specific mortality rate for oropharyngeal cancer according to age, HDI and location by sex. Metropolitan Region, 2002-2014.

Variables	Men		Women		Total		Rate ratio
	N(%)	Ratio	N(%)	Ratio	N(%)	Ratio	
General	726	5,93	331	2,31	1057	3,98	-
Quinquennials							
45-49	33	1,01	19	0,61	52	0,81	1
50-54	51	2,05	20	0,73	71	1,36	1,68
55-59	90	4,53	25	1,12	115	2,72	2,00
60-64	119	7,69	22	1,22	141	4,21	1,55
65-69	115	10,04	25	1,76	140	5,46	1,30
70-74	126	15,69	42	3,80	168	8,80	1,61
75-79	85	16,01	58	6,81	143	10,34	1,17
80+	107	22,58	120	11,63	227	15,08	1,46
HDI							
Very High	389	5,32	221	2,52	610	3,79	1,00
High	222	7,14	70	2,00	292	4,42	1,17
Medium	115	6,28	40	1,97	155	4,01	0,91
Location							
C00 Lips	19	0,16	4	0,03	23	0,09	-
C01 -C-02 Tongue	142	1,16	93	0,65	235	0,89	-
C03 Gums	5	0,04	3	0,02	8	0,03	-
C04 Floor of the mouth	74	0,60	20	0,14	94	0,35	-
C05 Palate	19	0,16	14	0,10	33	0,12	-
C06 Other poorly defined locations in the oral cavity	63	0,51	46	0,32	109	0,41	-
C07 Parotid gland	76	0,62	45	0,31	121	0,46	-
C08 Unspecified salivary glands	19	0,16	15	0,10	34	0,13	-
C09 Tonsils	68	0,56	23	0,16	91	0,34	-
C10 Oropharynx	79	0,65	28	0,20	107	0,40	-
C11 Nasopharynx	28	0,23	12	0,08	40	0,15	-
C12 Pyriform Sinus	16	0,13	2	0,01	18	0,07	-
C13 Hypopharynx	62	0,51	12	0,08	74	0,28	-
C14 Other poorly defined locations of the lips, oral cavity and pharynx	56	0,46	14	0,10	70	0,26	-

shown in Table 1, while the standardized rates according to age, sex and anatomical location and HDI are shown in Table 2.

The "high" HDI category had an adjusted rate 15.6% higher than the the "very high" HDI category and a male/female ratio of 4.16:1. In the "medium" HDI category, the rate was 13.8% higher than the "very high" HDI category and a male/female ratio of 3.84:1.

DISCUSSION.

Deaths from oropharyngeal cancer accounted for 0.99% of all deaths in the RM region between 2002 and 2014. This percentage has not changed from the previous period, between 1955 and 2002, in Chile.[5] This could be explained because even though the number of cancer prevention campaigns and policies has increased, the Chilean national cancer program does not specifically focus on

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oropharyngeal cancer.[3]

In relation to sex, mortality from OPC affects more men, which is consistent with the results published in the literature.[3] This could be explained because women get medical check-ups more frequently, smoke less and consume less alcohol than men, thus decreasing their risk of death.[6]

Regarding age, 96% of deaths from oropharyngeal cancer were individuals over 45 years, which is consistent with the results reported by Riera and Martinez.[5] This could be explained by the fact that the Chilean population is experiencing an aging process and therefore, the effects of tobacco and alcohol on the oral mucosa accumulate over longer periods of time.[7,8]

The most frequent locations and causes of death from oropharyngeal cancer were the tongue, followed by the parotid, which is consistent with what has been described in previous research.[5]

Emphasis is made on the finding of a relationship between the mortality rate and the HDI, consistent with the global reality, in which countries with a "very high" HDI have lower rates than countries with a "low" HDI.[9] According to Auluck *et al.*[10] people who live in more affluent neighborhoods have healthier lifestyles and are more aware of oral self-examination. On the contrary, people who live in the most vulnerable neighborhoods have little access to health services and consume more tobacco and alcohol.[10] However, the districts with a "high" HDI were found to have a higher mortality rate than those districts with a "medium" HDI, which could be associated with differences in lifestyles and risk factors.[9,10]

The main limitation of this research is the quality of the analyzed data. Although the INE database is validated, it may present information bias. Another limitation is the ecological fallacy that could lead to infer the findings observed at group level and apply them to the individual level.

CONCLUSION.

OPC mortality, between 2002 and 2014, was lower in the "medium" HDI category and was closely related to socioeconomic indicators.

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